Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

Claims 1-7 (cancelled).

8. (currently amended) An injection molding apparatus comprising:

[[(a)]]a hot runner system for supplying a stream of melt~~laminar flowing material~~, the hot runner system having

[[(i)]]an upstream melt passage,

~~(ii) a plurality of intermediary melt passages downstream from the upstream melt passage, and~~

~~(iii) for at least one intermediary melt passage, an associated~~ a pair of downstream melt passages downstream from the ~~intermediary~~ upstream melt passage and disposed substantially transverse to the upstream melt passage; and

a separate flow rotator disposed at a first junction between the upstream melt passage and the pair of downstream melt passages, wherein the flow rotator is substantially cylindrical and includes:

an inlet aligned with the upstream melt passage to receive the melt stream from the upstream melt passage,

an inlet passage receiving melt from the inlet and following an arcuate path such that a downstream portion of the inlet passage is substantially perpendicular to the upstream melt passage, and

a first outlet passage and a second outlet passage communicating with the inlet passage such that the flow of melt is split into two streams at a second junction between the inlet passage and the outlet passages, wherein each outlet passage has a curved path from the second junction to a respective first and second outlet, wherein the first and second outlets are disposed on opposite sides of the flow rotator, wherein the first and second outlets each communicate with a respective one of the pair of downstream melt passages such that melt flow from the upstream melt passage is substantially equally divided to flow in opposite directions in the pair of downstream melt passages; and

~~(b) for the upstream melt passage~~ and ~~the at least one intermediary melt passage~~, a flow path ~~for orienting the cross-sectional asymmetric condition of the laminar flowing material in the at least one intermediary melt passage such that the cross-sectional asymmetric condition~~ is substantially equally divided ~~between~~ the ~~associated pair of downstream melt passages; and,~~

[[(c)]]a plurality of hot runner nozzles in communication with and downstream from the downstream melt passages.

9. (currently amended) The injection molding apparatus as defined in claim 8, wherein ~~further comprising a manifold having~~ the hot runner system is disposed in a manifold.

10. (currently amended) The injection molding apparatus as defined in claim 8, wherein ~~further comprising a stack mold having~~ the hot runner system is disposed in a stack mold.

11. (original) The injection molding apparatus as defined in claim 8 wherein the flow path is non-planar.

12. The injection molding apparatus as defined in claim 11 wherein the first junction is disposed in a first plane and the second junction is disposed in second plane parallel to and above the first plane, wherein the first and second outlet passages are curved such that the melt returns to the first plane at the first and second outlets~~flow path comprises a sufficient amount of bending to rotate the cross-sectional asymmetric condition of the laminar flowing material in the at least one intermediary melt passage such that the cross-sectional asymmetric condition is substantially equally divided between the associated pair of downstream melt passages~~.

13. (cancelled).

14. (cancelled).

15. (cancelled)

16. (cancelled).

17. (currently amended) The injection molding apparatus as defined in ~~claim 13~~ claim 8 wherein the flow rotator comprises a one-piece body ~~having an inlet for receiving the laminar flowing material and at least one outlet for discharging the laminar flowing material, the inlet being connected to the outlet by the curved path; and,~~

~~the one-piece body is configured such to fit within the hot runner system~~.

18. (original) The injection molding apparatus as defined in claim 17 wherein the one-piece body comprises an integral heating element.

19. (currently amended) In a hot runner system for supplying a laminar flowing material, the hot runner system having [[(i)]] an upstream melt passage~~, (ii) a pair of intermediary melt passages downstream from the upstream melt passage, and (iii) for at least one intermediary melt passage, an associated~~ and a pair of downstream melt passages downstream from and substantially transverse to the ~~at least one intermediary~~ upstream melt

passage; a flow-rotator for rotating a cross-sectional asymmetrical condition of a laminar flowing material in the hot runner system, the flow rotator comprising:

[[(a)]]an inlet for receiving the laminar flowing material;

an inlet passage for receiving the laminar flowing material from the inlet, the inlet passage bending such that a downstream portion of the inlet passage is substantially perpendicular to the upstream passage; and

first and second outlet passages communicating with the inlet passage such that the laminar flowing material is split into two streams at a junction between the inlet passage and the outlet passages, wherein each outlet passage has a curved path from the junction to a respective first and second outlet, wherein the first and second outlets each communicate with a respective one of the pair of downstream melt passages such that the laminar flowing material from the upstream melt passage is substantially equally divided to flow in opposite directions in the pair of downstream melt passages,

wherein the flow rotator is a substantially cylindrically shaped plug.

~~(b) at least one outlet for discharging the laminar flowing material; and,~~

~~(c) a bending path for orienting the at least one outlet relative to the inlet to rotate the cross-sectional asymmetrical condition of the laminar flowing material such that the cross-sectional asymmetrical condition is substantially equally divided between the two downstream portions.~~

20. (cancelled).

21. (cancelled).

22. (currently amended) The flow rotator as defined in claim 19 wherein the junction ~~bending path~~ is offset from a plane including the upstream melt passage~~, the pair of intermediary melt passages downstream from the upstream melt passage,~~ and the ~~associated~~ pair of downstream melt passages ~~for each intermediary melt passage~~.

23. (cancelled).

24. (currently amended) The flow rotator as defined in claim 19, wherein the flow rotator comprises ~~further comprising a~~ one-piece body, wherein the inlet, the ~~branch~~ inlet passages, the ~~bending path~~ outlet passages and the two outlets are formed in the one-piece body.

25. (original) The flow rotator as defined in claim 24 wherein the one-piece body comprises an integral heating element.

26. (new) An injection molding apparatus comprising:

an injection manifold having a first melt channel and a second melt channel, wherein the second melt channel is substantially transverse with respect to the first melt channel;

a separate plug having a cylindrical body disposed within the manifold at a first junction between the first melt channel and the second melt channel, the separate plug including:

an inlet aligned with the first melt channel and having an unrestricted flow path to receive a stream of melt flowing through the manifold,

an inlet passage following an arcuate path such that a downstream portion of the inlet passage is substantially perpendicular to the first melt channel, and

a first outlet passage and a second outlet passage communicating with the inlet passage such that the flow of melt is split into two streams at a second junction between the inlet passage and the outlet passages, wherein each outlet passage has a curved path from the second junction a respective first and second outlet, wherein the first and second outlets are disposed on opposite sides of the plug, wherein the first and second outlets each communicate with the second melt channel such that melt flow from the first melt channel is substantially equally divided to flow in opposite directions in the second melt channel.

27. (new) The injection molding apparatus as defined in claim 26, wherein the second junction is offset from a plane including the first melt channel and the second melt channel.

28. (new) An injection molding apparatus comprising:

an injection manifold having a primary runner and two secondary runners, a plane defined by the primary runner and the secondary runners; and

a flow rotating plug installed in the injection manifold to connect the primary runner and the secondary runners, the flow rotating plug defining:

an inlet conduit having an arcuate path extending between an inlet and an intersection offset from the plane, the inlet being connected to the primary runner; and

two outlet conduits, each outlet conduit extending in a curve from the intersection back to the plane and to a respective outlet connected to a respective one of the secondary runners.

29. (new) The injection molding apparatus as defined in claim 28, wherein the flow rotating plug comprises a one-piece body defining the inlet conduit and the two outlet conduits.

30. (new) The injection molding apparatus as defined in claim 28, wherein an axis of the inlet conduit at the intersection is substantially perpendicular to the plane.

31. (new) The injection molding apparatus as defined in claim 28, wherein the two outlet conduits are fully defined by the flow rotating plug.

32. (new) The injection molding apparatus as defined in claim 28, wherein the two outlet conduits are partially defined by the injection manifold.